```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <time.h>

#define trigG 13
#define echoG A1
#define trigD A0
#define echoD A3
#define virM A7
#define virG A2
#define virD A6

#define Av 1
#define Ar -1
#define G 0
#define D 1
#define Stop 0

#define In1 2
#define In2 3
#define In3 4
#define In4 7

#define EnA 5
#define EnB 6

float  Nm, Nd, Ng, td, tg;
int  distM, distG, distD, dd, dg;
char motG, motD;
byte vitD, vitG, alpha;
unsigned long tvitesse, tdirection, tmode;
static int oldDroite = 0, oldGauche = 0;

LiquidCrystal_I2C lcd(0x27, 16, 2);
static unsigned long previousMillis = 0, oldmillisBlocage = 0;

void infrarouge();
void ultrason();
void cmdMot(bool mot, char labas, byte v);
void marcheArriere ();

void setup() {
  pinMode(trigD, INPUT);
  pinMode(echoD, INPUT);
  pinMode(trigG, INPUT);
  pinMode(echoG, INPUT);
  pinMode(virM, INPUT);
  pinMode(virG, INPUT);
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  pinMode(virD, INPUT);

  Serial.begin(9600);
  lcd.begin();
  lcd.backlight();
  lcd.setCursor(0, 1);
  lcd.print("G:");
  lcd.setCursor(10, 1);
  lcd.print("D:");
}

void loop() {
  unsigned long currentMillis = millis();
  unsigned long millisBlocage = millis();

  if (currentMillis - previousMillis >= 100) {
    previousMillis = currentMillis;

    infrarouge();

    if ((millisBlocage - oldmillisBlocage) >= 3000) {
      oldmillisBlocage = millisBlocage;
      oldDroite = distD, oldGauche = distG;
    }

    if (distM <= 35) {

      if (distD == 10 || distG == 10) {
        if (distD == oldDroite || distG == oldGauche) {
          marcheArriere ();
        }
      }

      if (distG > distD) {
        motD = Av;
        motG = Ar;
        vitD = 25;
        vitG = 30;
      }
      if (distD > distG) {
        motG = Av;
        motD = Ar;
        vitD = 30;
        vitG = 25;
      }
      if (distD == distG) {
        motG = Ar;
        motD = Ar;
```

```
      vitD = 35;
      vitG = 35;
    }

  }

  if (distM > 35) {

    if (distD == 10 || distG == 10) {
      if (distD == oldDroite || distG == oldGauche) {
        marcheArriere ();
      }
    }

    if (distD > 10 && distG > 10)  {
      motG = Av;
      motD = Av;
      vitD = 35;
      vitG = 35;
    }
    else {
      if (distD == 10) {

        motG = Av;
        motD = Av;
        vitD = 30;
        vitG = 25;
      }
      if (distG == 10) {
        motG = Av;
        motD = Av;
        vitD = 30;
        vitG = 25;
      }
    }
  }

  cmdMot(G, motG, vitG);
  cmdMot(D, motD, vitD);
 }
}

void ultrason() {
 analogWrite(trigD, 255);
 delayMicroseconds(10);
 analogWrite(trigD, 0);

 dd = pulseIn(echoD, HIGH, 5882) * 0.017;
```

```
  if (dd == 0) {
    dd = 99;
  }
  if (dd < 10) dd = 10;

  digitalWrite(trigG, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigG, LOW);

  dg = pulseIn(echoG, HIGH, 5882) * 0.017;
  if (dg == 0) {
    dg = 99;
  }
  if (dg < 10) dg = 10;

  Serial.print("distance droite : ");
  Serial.println(dd);
  lcd.setCursor(13, 1);
  if (dd < 10) {
    lcd.print(' ');
  }
  lcd.print(dd);

  Serial.print("distance gauche : ");
  Serial.println(dg);
  lcd.setCursor(3, 1);
  if (dg < 10) {
    lcd.print(' ');
  }
  lcd.print(dg);
}

void infrarouge() {
  Nm = analogRead(virM);

  distM = 18151.4 * pow(Nm, -1.22415665);

  if (distM > 80) distM = 80;
  if (distM < 10) distM = 10;

  Serial.println("dist av: ");
  Serial.println(distM);
  lcd.setCursor(0, 0);
  lcd.print("M: ");
  lcd.setCursor(3, 0);
  lcd.print(distM);

  Nd = analogRead(virD);
```

```
  distD = 18151.4 * pow(Nd, -1.22415665);

  if (distD > 80) distD = 80;
  if (distD < 10) distD = 10;

  Serial.println("dist D: ");
  Serial.println(distD);
  lcd.setCursor(13, 1);
  lcd.print(distD);

  Ng = analogRead(virG);

  distG = 18151.4 * pow(Ng, -1.22415665);

  if (distG > 80) distG = 80;
  if (distG < 10) distG = 10;

  Serial.println("dist g: ");
  Serial.println(distG);

  lcd.setCursor(3, 1);
  lcd.print(distG);
}

void cmdMot(bool mot, char labas, byte v) {
  if (mot == G) {
    if (labas == Ar) {
      digitalWrite(In1, HIGH);
      digitalWrite(In2, LOW);
    } else if (labas == Av) {
      digitalWrite(In1, LOW);
      digitalWrite(In2, HIGH);
    } else if (labas == Stop) {
      digitalWrite(In1, LOW);
      digitalWrite(In2, LOW);
    }
    analogWrite(EnA, v * 2.55);
  }
  if (mot == D) {
    if (labas == Ar) {
      digitalWrite(In4, HIGH);
      digitalWrite(In3, LOW);
    } else if (labas == Av) {
      digitalWrite(In4, LOW);
      digitalWrite(In3, HIGH);
    } else if (labas == Stop) {
      digitalWrite(In4, LOW);
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      digitalWrite(In3, LOW);
    }
    analogWrite(EnB, v * 2.55);
  }
}

void marcheArriere () {

  if (distD > distG) {
    cmdMot(G, Ar, 25 );
    cmdMot(D, Ar, 35);
  }
  if (distG > distD) {
    cmdMot(G, Ar, 35 );
    cmdMot(D, Ar, 25);
  }
  delay(1000);
}
```